Ethical Dow Jones indexes and investment performance: international evidence

Ethical Dow Jones Indexes and Investment Performance: International Evidence

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Abstract

This study examines the relative importance of the *Shariah*-Compliant Dow Jones market indexes to capture the dynamic behavior of stock returns at economy and industry levels. The analysis indicates that ethical investment has only an insignificant influence on the performance of stock market returns for both the economy and industry levels. Further, alternative measures of investment performance including the Carhart and Habit Formation models have been used to examine the behavior of the *Shariah*-Compliant Dow Jones market indexes. The findings suggest a negative market timing ability with both Islamic and conventional indexes. While Islamic indexes are growth focused, conventional indexes are value focused. Further, when investigating the performance of Islamic and conventional Dow Jones indexes during the recent financial crisis, there is evidence supportive of Islamic indexes against conventional ones. For sector groupings, the results indicate that parameter estimates are not consistent, suggesting that Islamic indexes are sector oriented. These results are explained to be a consequence of less diversification in Islamic indexes, leading to higher risk in some sector groupings such as technology and consumption services.

Keywords: Faith-based Ethical Investments; Islamic Dow Jones Indexes; Habit Formation.
JEL Classification:G12; G20; G23; G32

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1 Introduction

The topic of Islamic Finance has received significant attention in the financial press, in particular during the recent global financial crisis. According to Sherif and Shaairi (2013, p.27), "it is no longer a niche product serving a specialised market but is now offered in more than 60 countries, with total assets in Islamic banking reportedly exceeding $1.2 billion, Islamic mutual funds estimated to be valued over $58 billion, and issuance of Islamic sovereign and corporate bonds, or *Sukuk*, to be about $84 billion in 2011." Further, an increasing international tendency towards Islamic finance has gained greater attention and recent dimensions have emphasized its prevalence in the global markets. Its move from a merely banking-based industry into broader aspects of market-based instruments have made Islamic capital markets the most rapid growing sector in the Islamic finance industry, and they have witnessed unprecedented expansion over the last decades (Dewandarua et al., 2015). This expansion may be due to the large growth of the capital value of Muslim investors and their strong demand for *Shariah*-compliant investment avenues, which prohibits interest (riba), excessive risk-taking (*gharar*), or gambling (*maysir*), and concomitantly promotes risk-sharing, profit-sharing, and asset-backed financial transactions (Zaher and Hassan,2001; El-Gamal, 2006; Iqbal and Mirakhor, 2011; Sherif and Shaairi, 2013).

Within the significant developments of Islamic financial system, the faith-based ethical Islamic investment industry, which is regarded as a subset of the ethical investment universe, has also witnessed increasing development and growth, clearly demonstrating the recognition of Islamic investment as a prominent device for enhancing *Shariah* compliant protection. Consequently, the Islamic investment industry has proven to be resilient and has recorded a solid growth momentum in spite of the intense competition from conventional peers (Beck and Webb, 2003; Yazid et al., 2012; Charles et al., 2015).

Arguably the most contentious issue about any ethical investment vehicle is whether ethical overlays have a bearing on financial performance. Whilst a number of previous studies have examined this issue (Hassan et al., 2005; Al-Khazali et al., 2014; Ashraf and Mohammad, 2014; Charles and Darn, 2014; El Khamlichi et al., 2014; Ho et al., 2014; Jawadi et al., 2014; Shamsuddin, 2014; Charles et al., 2015), much uncertainty remains regarding the significance of this relation. The general perception and critique facing faith-based ethical investments stem from their contradiction with the principles of the efficient portfolio theory of Markowitz (1952). It has been claimed that ethical investments tend to under-perform in the long run because they are subsets of the market portfolio and lack sufficient diversification (Bauer, et al., 2006). According to Hickman et al. (1999, p.73), diversification is a "consequence of the imperfect correlations of returns between securities". Consequently, commonly investors tend to diversify their portfolios in order to minimize their risk and maximize their returns. However, several previous studies do not show a general consensus that ethically screened firms outperform their non-ethical screened counterparts (see for example Diltz, 1995; Guerard, 1997; Sauer, 1997; Kreander, Gray, Power and Sinclair, 2005; Charles et al., 2015). Furthermore, although the Islamic finance industry is growing rapidly, and much is known about the performance of conventional indexes in the developed countries, there is a paucity of literature that has investigated the faith-based ethical investments issue in general, and in the developing countries in particular (Annuar et al., 1997; Abdullah et al., 2002; Hussein, 2004; Elfakhani and Hassan, 2005; Girard and Hassan, 2008; Dharani and Natarajan, 2011).

Inspired by the above arguments and the stages of evolution of the Islamic financial services seen in Table 1, this study examines and provides a new evidence on the impact of *Shariah* filtering criteria on the performance of Dow Jones Islamic market indexes relative to their conventional counterparts. To do this it considers seven Islamic regional and five sectorial indexes and conventional counterparts (Global, Asia Pacific, European, USA, UK, Developed, Emerging markets; Oil and Gas, Technology, Health Care, Consumer Goods, Consumer Services indices). To this end, different standard performance ratios, the CAPM, Carhart (1997) model and the Habit Formation model of Campbell and Cochrane (2000), which take into account the financial risk time-variation, were estimated in order to provide precise

investment performance evaluations. Thus, this study contributes to the existing literature in several ways: (i) while most empirical and theoretical research focuses heavily on investigating the performance issue using the standard performance ratios, there is only limited academic research conducted on a range of performance measures including recent promising asset pricing models. As this study does this, it enables the risk to be time-varying and have an affect on the scrutiny and quality of the empirical results; (ii) this study focuses on different international regions including transition economies, Western countries and the whole World; (iii) although the performance of the external habit formation model of Campbell and Cochrane (2000) has been widely examined in the literature using conventional indexes (Hyde and Sherif, 2005), there are only a few studies that have investigated the same relationship using Faith-based Ethical indexes; and (iv) the impact of the global financial crisis on the performance of investment indexes, in particular the ethical investments, is an important and ultimately new empirical question; (v) to this author's knowledge, Treynor and Mazuy's (1966) model has not been adopted to assess the timing ability of Islamic indexes in the previous studies.

Table 1 about here

The findings of this paper point to various significant results. Firstly, in general there is no convincing evidence supporting the performance differences between faith-based ethical and conventional indexes unrelated to the performance measures. In addition, whilst the financial performance of Islamic and conventional investments is relatively close in periods of calmness, conventional investments have failed to outperform the faith-based ethical investments during periods of crisis. Finally, the level of performance appreciation varies depending on the region under consideration (possibly reflecting the degree of Islamic finance development in the country in question) but also depending on the screening conditions and the Islamic index and performance measures used.

The remainder of this paper is structured as follows. Section 2 is a brief literature review of studies that have considered the faith-based ethical investment/indexes. Section 3 provides details of the methodology, standard performance measures and models. Section 4 presents the data and empirical results, and section 5 concludes the paper, stating the significance of the main findings and suggesting avenues for future research.

2 Literature Review and Hypotheses

There has been a long running debate in the academic literature regarding the performance of ethical investments over conventional investments (Hamilton et al., 1993; Luther and Matatko, 1994; Diltz , 1995; Mallin et al., 1995; Sauer, 1997; Girard and Hassan, 2008; Goldreyer et al., 1999; Statman, 2000; Durand et al., 2013a; Becchettia et al., 2015). Recently, *Shariah* compliant investments, which represent aspect of the ethical and 'restricted' finance, have been the focus of a growing body of empirical research. Among recent studies on the Islamic stock indexes, a few have focused on the Dow Jones Market Indexes (DJIMI) (Hassan et al., 2005; Al-Khazali et al., 2014; Ashraf and Mohammad, 2014; Charles and Darn, 2014; El Khamlichi et al., 2014; Ho et al., 2014; Jawadi et al., 2014; Shamsuddin, 2014; Charles et al., 2015). The majority of these studies as seen in Table 2 have followed the same methodologies of comparing the performance of DJIMI to other benchmarks, but the choices are quite different from one study to another, depending on the performance measures and benchmarks used. Another group of studies (Hussein, 2004; Daraio and Simar, 2006; Miglietta and Forte, 2007; Girard and Hassan, 2008; Binmahfouz and Hassan, 2012; Durand et al., 2013; Abdelsalam et al., 2014; Nofsinger and Varma,

2014; Matallan-Sez et al., 2014; Becchetti et al., 2015; Dhai, 2015) has investigated the performance of the FTSE and other Islamic indexes.

One strand of these existing studies has investigated the impact of ethical screening on the performance of Islamic indexes relative to their conventional counterparts using standard financial performance ratios. In this strand Annuar et al. (1997) examined 31 Islamic Malaysian mutual funds using the standard ratios and Treynor and Mazuy models, and found that Malaysian funds outperformed their benchmark. Also, Manao and Deswin (2001) analyzed the relationship between financial ratio and stock returns during the economic crisis in Indonesia, using 120 manufacturing companies listed on IDX. Their findings suggested only an insignificant difference between the performance of Islamic and conventional indexes. In another study, Ahmad and Ibrahim (2002) examined the performance of the Kuala Lumpur Shariah Index (KLSI) and the Kuala Lumpur Composite index (KLCI) in Malaysia and found evidence supportive of the outperforming ability of the Shariah KLSI in the growing period. Similarly, Abdullah et al. (2002) examined the performance of Malaysian Islamic investments relative to conventional unit trusts using Sharpe and adjusted Sharpe ratios, Jensen Alpha, timing and selectivity ability, and claimed that Islamic investments are less diversified than conventional ones. Elsewhere, Hakim and Rashidian (2002) investigated the performance of Dow Jones Islamic market indexes and again found only insignificant differences between the performance of conventional and non-conventional indexes. In another study, Rahmayanti (2003) investigated the performance of a *Shariah* compliant portfolio in the Jakarta Stock Exchange using the return, risk, Sharpe, Jansen, and Treynor ratios along with *Shariah*-based indexes and the Jakarta Composite Index (JCI). They found mixed results across the different periods of the study. In the same vein, Elfakhani and Hassan (2005) analysed the performance of 46 international Islamic mutual funds during the period 1997-2002 using standard ratios (Sharpe, Treynor, and Jensen Alpha). They examined the performance in different economic conditions using S&P 500 to present conventional benchmark and Dow Jones Islamic index as an Islamic benchmark. They found that the performance of the funds was consistent using different models and benchmarks. Overall, they found no statistically significant risk adjusted abnormal reward and the performance of Islamic mutual funds showed no significant difference to conventional funds. In another study, using US Dow Jones Islamic Indexes, Khathatay and Nisar (2007) examine the *Shariah* screening rules. Overall, (i) they found that the Malaysian SEC is the most liberal and DJIM was the most conservative; (ii) argued that total assets is a superior input to market capitalization when using financial ratio; and (iii) that the Islamic finance industry can be promoted by establishing a *Shariah* rating agency.

Using different faith-based ethical indexes, Hussein (2004) investigated the performance of ethical investments using FTSE Islamic indexes. Their study compared the performance of FTSE Global Islamic index and FTSE4Good to FTSE all-world index during the period 1996-2003. Their findings indicated that the Islamic index performed the same as the FTSE all-world index during the entire period. However, in contrast to the bear market period, in the bull market period the Islamic index outperformed its conventional benchmark. Overall, the study found no clear supportive evidence of the ethical investment compared to its unscreened benchmark.

In addition, Albaity and Ahmad (2008) investigated the performance of the Kuala Lumpur *Shariah* index (KLSI) and the Kuala Lumpur Composite index (KLCI) in Malaysia using risk adjusted performance measurement, causality and the Johansen co-integration test. Their findings showed only an insignificant return difference between both indexes. Similarly, Girard and Hassan (2008) developed their previous study by analysing the cost of faith-based investing using FTSE Islamic and non-Islamic indexes during the period from 1999-2006 and by using Sharpe ratio, Treynor ratio, Jensen Alpha, Carhart model and Johansen co-integration tests. They concluded that investors will have similar rewards to risk and diversification benefits exist for Islamic and non-Islamic indexes with only an insignificant difference between the performance of the two indexes. While Krussl and Hayat (2008) argued that there is insignificant performance difference between IEFs and Islamic and conventional benchmarks during

normal market conditions, the studies of Mansor and Bhatti (2009), Hoepner et al. (2011) and Kamil et al. (2013) all failed to yield evidence supporting the performance of Islamic mutual funds. Further, Chiadmi and Ghaiti (2012) examined the performance of Standard & Poor *Sharia* and Standard & Poor 500 using the ARCH and GARCH model and found significant volatility persistence within both indexes, but the S&P Shariah Index was less volatile than the conventional one in the long run, even during the crisis periods. Similarly, Natarajan and Dharani (2012) using standard ratios (Sharpe, Treynor and Jensen's alpha) examined the performance of a range of *Shariah*-compliant stocks and benchmark indexes in India. Their results suggested that Nifty *Shariah* and Nifty indexes have the same level of performance.

One further argument that has recently been given much attention is related to the asset pricing model as a measure of performance of Islamic investment structure. Here, Hakim and Rashidian (2002) examined the performance of CAPM and found that the DJIMI performed well when compared to the Dow Jones World (DJW) index, but under-performed the Dow Jones Sustainability (DJS) World Index. Other studies, (for example, Hussein, 2004, 2005; Girard and Hassan, 2005) have investigated the issue further and have suggested that Islamic indexes under-perform during the bear period, but outperform during the bull period, with a clear justifications for investing in growth and small-cap firms. In the same vain, Hussein and Omran (2005) investigated the performance of the Islamic index using the Dow Jones and the Dow Jones World Index, through using CAPM, Sharpe ratio, and Treynor ratio. They found evidence supportive of the performance of Islamic indexes for both the entire period and the bull market period. However, other periods failed to yield economically plausible parameter values. Furthermore, Hassan et al. (2005) investigate the performance of Dow Jones Islamic indexes and MSCI indexes using standard financial performance measures (Sharpe, Treynor, Jensen's Alpha ratios) and Fama and French's model. The indexes include seven geographical areas: Canada, the United Kingdom, the United States, Europe, Emerging Markets, Asia and the World over the period 1996-2005. In general, they found only insignificant differences between Islamic and non-Islamic indexes along with a comparable level of rewards to risk and diversification benefits.

More recently, Mansor and Bhatti (2011) used the CAPM model to examine the monthly performance of 128 Islamic mutual funds in Malaysia *IMFs* over the period 1990-2009. They found that Malaysian Islamic mutual funds outperformed their traditional benchmarks. Their results also indicated that Islamic and conventional investment decision makers are equipped with substantial positive stock selectivity skills and market timing competence. When comparing *IMF* with their conventional counterparts, they found *IMF* fund managers offered significant performance in stock selectivity, but only found insignificant findings for their market timing ability relative to their counterparts. Similarly, Hayat and Kraussl (2011) investigated the characteristics and behavior of the return and risk for 145 open-ended Islamic mutual funds over the period 2000-2009 using a range of approaches to compute Jensen α, systematic risk β, downside risk and market timing ability. They found that the Islamic equity funds provided significantly lower performance compared to the non-Islamic counterpart, in particular during the times of economic turmoil in 2008. They also identified *IEF* managers as being weak marketing timers whose decisions resulted in the loss of returns. In addition, Abbes (2012) examined the risk and return behavior of a range of Islamic and conventional benchmark indexes across 35 international developed, emerging and *GCC* markets over the period 2002-2012. Using the common statistics *t-test*, Abbes (2012) found only insignificant differences between *Shariah* and conventional counterparts except in Australia and Italy. Their study also examined the relationship between returns and volatility and found only insignificant differences between Islamic and conventional indexes and that the level of debts affects risk across all corresponding market. In the same context, Becketal.(2010) investigated the efficiency hypothesis for Islamic and conventional banking systems, and Cihak and Hesse (2010) investigated the financial stability hypothesis for two Islamic banks and found inconclusive and mixed findings. Elsewhere, Milly and Sultan (2012) conclude that the money invested in Islamic stocks is safer for periods of economic financial distress, and Similarly, Hayat and Kraussl (2011) examined the

performance of Islamic (IEFs) and conventional equity funds over the period 2000-2009 and found that the conventional indexes under-performs compared to Islamic indexes.

Table 2 about here

In conclusion, there is no conclusive evidence that ethically screened investments under-perform conventional investments. Thus, the argument about a financial penalty for being an ethical investor is debatable. Importantly, previous studies found evidence that the relative performance of faith-based ethical investing varied across geographical areas due to their characteristics of merit. Given the findings from the literature provided above, this study argues that there is no impact for faith-based ethical investment on the investment performance. Hence, the hypothesis can be identified as follows:

H0. there is no significant difference of stock returns between Shariah and Conventional investments.

3 Models and Methodology

3.1 Performance Measures

There is a range of financial measures and asset pricing models that have been recently used to assess the performance of ethical and conventional investments. This section highlights the standard performance measures that have been used in the financial literature.

Absolute Risk-Adjusted Performance Measures

1 Sharpe Ratio (1966)

This ratio was advocated by William Sharpe (1966) and measures the average return on a portfolio in excess of the risk-free rate of return, or the risk premium of a particular portfolio contrasted to the total risk of a portfolio measured by its average deviation. For example, if the return on stock investments is $\leq$ the risk-free rate, then it indicates no need to invest in risky assets. Consequently, the Sharpe ratio (SR) is a performance measure for portfolio compared to the risk taken. In other words, if *SR* is significantly higher, then the performance will be much better and the profits for taking on additional risk greater. Importantly, *SR* is sometimes erroneously identified as a risk-adjusted return and portfolios can be ranked in order of preference, however, it is not easy to gauge the size of relative performance (Leland, 1999). In addition, *SR* is inappropriate when returns are unexpectedly non-normal. The *SR* for portfolio *p*, which is initially called the reward-to-variability ratio, is then identified as:

$$SR_{ind} = E(R_p - R_f)/\delta_p \tag{1}$$

where $E(R_p)$ is the expected return on investments or index; $E(R_f)$ is the risk-free return; δ_p is the standard deviation(SD) of the return on investments and defined as:

$$\delta_p = \sqrt{(n/n-1)\sum_{t-1}^{n}(R_{p_t} - \bar{R_p})^2/n} \tag{2}$$

where *n* is the number of return observations in the sample.

2 The Treynor Black Appraisal Ratio (AR)

The *AR* is a further developed version of Jensen's α and the relevant risk-adjusted performance statistic when evaluating new investments. It measures the systematic risk adjusted reward per unit of specific risk taken. *AR*, which was first advocated by Treynor & Black (1973), is comparable in concept to *SR*. According to Sharpe (1994), the appraisal ratio is set with the assumption that the risk-free asset is substituted by a benchmark portfolio and identified as:

$$AR_p = \alpha_p / \sigma(\mu_p) \tag{3}$$

where α is the Jensen's α_p of the portfolio and σ is the non-systematic risk.

Jensen's α is the excess return adjusted for systematic risk in the numerator divided by the portfolio's non-market risk (i.e., unsystematic risk) in the denominator.

3 Excess Standard Deviation Adjusted Return (eSDAR)

eSDAR was suggested by Statman (2000), and measures the excess standard deviation adjusted return, which modifies *SR* and is the short-term excess return of a portfolio over the market return. The higher the value of *eSDAR*, the higher the returns on the portfolio. This measure is identified as:

$$eSDAR = R_f + (R_i - R_f)/SD_i \times SD_m - R_m \tag{4}$$

where R_i is the return on index *i*; R_m is the market return; R_f is the risk free rate of return; SD_i and SD_m are standard deviations of the index and its benchmark market index respectively.

4 Treynor Ratio (1965)

This ratio measures the association between the excess return on investments and its systematic risk. It is drawn undeviatingly from the standard CAPMs. To measure this ratio, a benchmark index is needed to help estimating the β of the portfolio/investments. It is worth noting that the Treynor ratio is appropriate for a well-diversified portfolio, as it simply seizes the systematic risk (undiversified risk) of the portfolio (Srivastava and Essayyad, 1994) when measuring the performance. Hence, this ratio is frequently used when the portfolio is part of a fully diversified index and is identified as:

$$TR = (\bar{R}_i - \bar{R}_f)/\beta_i \tag{5}$$

where $\bar{R}_i$ is the average return on index *i*; $\bar{R}_f$ is the average risk free rate of return; β_i remarks the beta of index *i*.

Relative Risk-adjusted Performance Measures

These groups of measures evaluate the funds' risk-adjusted returns in reference to a benchmark.

6 Jensen's Alpha (1968)

Jensen's α is based on the excess returns and risk-adjusted returns estimated by the standard capital asset pricing model CAPM. While the positive (negative) α implies that the index is outperforming (underperforming) stocks, zero *alpha* implies that the index performance is normal as expected in CAPM, and has no excess returns over the systematic risk. One significant difference between CAPM and Jensen's α is that the former is based on expected returns while the latter is based on realised returns. This is beneficial for both researchers and investors who have access to historical (realised) data. In addition, it is the type of return that does not bear them the cost associated with systematic risk, as it is positive even when β is zero. However, Jensen's α unreasonable assumes that β is stationary, as investors accustomed to moving between sectors and assets classes with a significant change in β. Furthermore, α is often criticized as being a proxy for other factors that determine returns except market exposure. This indicator is defined as:

$$\alpha_i = R_i - [R_f + \beta_i(R_m - R_f)] \tag{6}$$

where α_i is the intercept and quantifies the exceeded returns over a given systematic risk. It identifies the percentage of additional return that is due to the investor's choices; β_i is the systematic risk of index *i*; R_i is the return on index *i*; R_m is the return on the market index; and R_f is the risk free rate of return.

7 Treynor and Mazuy Model(1966)

This measure, which is known as the Market Timing Ability (γ) model, was advocated by Treynor and Mazuy (1966), who introduced a measure which allows for the ability of investment decision makers to partially shift their investments between safe financial assets (debts) and risky financial assets (securities) depending on whether the market is expected to go up or down.[1] Unlike Jensen's α_i or CAPM, the *TM* model adds a quadratic term or relationship between excess returns on investments and excess returns on markets when timing the market is successfully managed. This implies that investors will increase their investments when the market is up, and γ_i is positive and statistically significant. When investors anticipate a rise in the market, they increase their portfolio's β, which enables them to make higher profits. The model is identified as:

$$\begin{aligned} R_i - R_f = \alpha_i + \beta_i(R_m - R_f) + \\ \gamma_i(R_m - R_f)^2 + \varepsilon_i \end{aligned} \tag{7}$$

where R_i is the return on index *i*; R_m is the market return; $(R_m)^2$ is the squared market return, R_f is the risk free rate of return, α_i is an intercept and quantifies returns over a given systematic risk, β_i is systematic risk *i*, ε_i is an error term, and γ_i is a market timing measure.

8 M^2 Measure

M^2 is an extension measure of the Sharpe ratio (*SR*), which quantifies the risk-adjusted performance (RAP) of a portfolio relative to the benchmark market index. It is worth noting that M^2 measures the performance of an index relative to the market rather, in contrast to its being an absolute measure like the *SR*. The better the index, the higher the *RAP* value.[2] This can be identified as:

$$MM = (S\bar{R}_i - S\bar{R}_m)/\delta_m \tag{8}$$

where $S\bar{R}_i$ is the Sharpe ratio *SR* of index *i*; $S\bar{R}_m$ is the Sharpe ratio*SR* of the market index; and δ_m is the standard deviation of the market index.

[1] Theoretically validated by Jensen (1972) and Bhattacharya and Pfleiderer (1983).

[2] M^2 refers to Modigliani and Modigliani (1997)

3.2 Asset Pricing Models

1 Fama and French's Three-Factor Model

The Fama and French (1993) three-factor model controls the event clustering and cross-correlation in returns on investments and is identified as:

$$R_{it} - R_{ft} = \alpha_i + \beta_{1i}(R_{mt} - R_{ft}) + \beta_{2i}SMB_t + \beta_{3i}HML_t + \varepsilon_{it} \tag{9}$$

where R_{it} is the expected return on asset *i*; R_{ft} is the risk-free rate of return; R_{mt} is the market return; *SMB* (small minus big) is the difference between returns on a small capitalisation portfolio and a large-capitalisation portfolio; and HML (high minus low) is the difference between returns on a portfolio with a high book-to-market ratio and a portfolio with a low book-to-market ratio. According to Fama and French (1996), the *SMB* and *HML* portfolios are organized by market capitalisation and book-to-market value. Thus, the SMB_t (Small minus Big) factor is calculated as follows:

$$SMB_t = \textit{Average Returns of Small Size - Average Returns of Big Size}$$

$$= (SL + SM + SH)/3 - (BL + BM + BH)/3$$

and HML_t (High minus Low) factor is calculated as:

$$HML_t = \textit{Average Returns of High BE/ME ratio - Average Returns of Low BE/ME ratio}$$

$$= (SH + BH)/2 - (SL + BL)/2$$

2 Carhart's Four-Factor Model (1997)

Carhart's 4-factor model is an extension of the 3-factor model of Fama-French (1993). The additional factor is a momentum factor (MOM_t), which is constructed following Carhart (1997) as the average return on the past winner stocks minus the average return on the past loser stocks.

$$R_{it} - R_{ft} = \alpha_i + \beta_{1i}(R_mt - R_ft) + \beta_{2i}SMB_t + \beta_{3i}HML_t + \beta_{4i}Mom_t + \varepsilon_{it} \tag{10}$$

The monthly size breakpoint was the median market value. The return breakpoints were the 30^{th} and 70^{th} percentiles. The MOM_t variable was therefore defined as:

$$MOM = \frac{1}{2}(\textit{Small High + Big High}) - \frac{1}{2}(\textit{Small Low +Big Low})$$

3 The Habit Formation Model

As evidence against the reliability of the CAPM has accumulated, recent studies and developments in asset pricing have placed an emphasis on the success of the habit formation model of Campbell and Cochrane (2000). Since differences in investment performance may be explained by differences in systematic risk, size, and value factors (in addition to habit formation specification), the study detailed in

this current paper provides new evidence on the performance of faith-based ethical investments by estimating the risk-adjusted returns/performance using the universally accepted habit formation approach of Campbell and Cochrane (2000). The fundamental idea is that when the consumption of investors is low(high) relative to their habit, relative risk-aversion is high (low), leading to high (low) expected returns/performance. Campbell and Cochrane (2000) identified the utility function as: [3]

$$U_t = E_t[\sum_{j=0}^{\infty} \beta^j \left(C_{t+j} - X_{t+j}\right)^{1-\gamma} - 1\big/(1-\gamma)] \tag{11}$$

Campbell and Cochrane (2000) define S_t(surplus consumption ratio), or the difference between consumption and the habit level as:

$$S_t \equiv (C_t - X_t)/C_t$$

Using the following Euler equation, investment performance can be examined as:

$$E_t\left[\beta \left(C_{t+1}/C_t \times S_{t+1}/S_t\right)^{-\gamma} \left(1 + R_{i,t+1}\right) - 1\right] = 0 \tag{12}$$

where the stochastic discount factor, M_{t+1} is

$$M_{t+1} = \beta \left(C_{t+1}/C_t \times S_{t+1}/S_t\right)^{-\gamma} \tag{13}$$

4 CAPM and the Risk Free Rate of Return

One important and much debated component of Islamic capital asset pricing models is the risk free Rate of Return (RFRoR). It is well documented that the basic conventional CAPM is developed in an interest-based framework (Chen and Sherif, 2016), which is not the case with *Shariah* based investments (Sherif and Lusyana, 2017). For *Shariah*(Islamic law), the CAPM risk mechanism is somewhat different from conventional CAPM, as there are no risk free investments available in the Islamic-based markets. For example, Sherif and Shaairi(2013) indicate that according to *Shariah* any fixed amount of loan is considered interest, which is prohibited in *Shariah* law. Alternatively, they use Mudarba or other forms of Islamic investments, which are not considered fixed returns in Islam. Hence, the original equation of the standard CAPM is not workable and needs to be modified. Indeed, there are three documented modifications of risk free returns in regard to *Shariah*-based CAPM.

Firstly, estimating Islamic CAPM without including risk-free rate, implies that there is no minimum compensation in the form of risk free return (Chou and Lin, 2002; Gomez and Zapatero, 2003; Naughton and Naughton, 2000; Sadaf and Andleeb, 2014). According to this suggestion, Islamic CAPM is identified as:

$$R_i = \beta_i(R_m) \tag{14}$$

Secondly, another strand of research (Sadaf and Andleeb, 2014) has paid significant attention to Zakat as a proxy for risk-free rate of return, meaning that the minimum return required by Muslim investors should cover the amount deducted for Zakat (2.56%), or alms giving, required by each individual Muslim (Sadaf and Andleeb, 2014). Here, Islamic CAPM is specified as:

[3]For more details on habit formation preference model, see a paper Hyde and Sherif (2010).

$$R_i = Zakat\% + \beta_i(R_m) \tag{15}$$

where Zakat $\%$ is a proxy or risk-free rate of return and risk premium is identified as:

$$(R_m - Zakat\%)$$

Thirdly, much attention has been given to nominal gross domestic product growth (NGDPG) as a proxy for risk free rate of return (Sheikh, 2010; Sadaf and Andleeb, 2014). Consequently, the investor's required rate of return will be based on nominal GDP growth rate and risk premium is measured as beta associated with the difference between return on market and GDP growth rate. Here, the Islamic CAPM is identified as:

$$R_i = NGDPG + \beta_i(R_m - NGDPG) \tag{16}$$

Finally, inflation was used as a proxy for risk-free rate of return (Hanif, 2011; Sadaf and Andleeb, 2014). By including the inflation factor as a proxy for the risk-free rate investors in the Islamic-majority countries, they will gain the same purchasing power over time. Consequently, CAPM is:

$$R_i = Inflation + \beta_i(R_m - Inflation) \tag{17}$$

For the investigation conducted in this paper, the 3-month Treasury bill is adopted as the proxy for the risk-free rate. This is justifiable, as it is considered compensation for the excessive inflation that is common in most Muslim countries. Indeed, inflation leads to a significant level of reduction in investor wealth, and hence investors should be compensated by a rate equivalent to that of inflation.

3.3 Methodology

This section details the methodology that has been adopted in this study to achieve its objectives. The parametric *t* statistic is utilized to test the null hypothesis associated with the standard financial ratios. [4]

To test the behavior of both Dow Jones faith-based ethical (Islamic) and conventional indexes, this study estimated the return on a monthly basis by using the log difference of the price index. This is identified as:

$$R_{i,t} = \left[log(price_{i,t}) - log(price_{i,t-1})\right] \tag{18}$$

where $R_{i,t}$ is the raw returns for index *i* at time *t* and $price_{i,t}$ is the price of index *i* at time *t*;

To test the null hypothesis H_0, the *t* ratios of the α and β are obtained by dividing the means of α and β by their standard errors. The *t* ratios for α and β are identified as:

$$t_\alpha = \bar{\alpha}/(\sigma_\alpha/\sqrt{n}) \tag{19}$$

[4]The non-parametric test statistic is less sensitive to the presence of outliers, so as a robustness this study uses both test statistics but reports the t-test only to save space.

$$t_\beta = \bar{\beta}/(\sigma_\beta/\sqrt{n}) \tag{20}$$

The *t* statistics are then compared to the critical *t* statistic. The null hypothesisH_0 is rejected if:

$$\mid t \mid < \textit{the critical t}$$

.

Since the raw returns are not adjusted for risk, and the ethical (Islamic) indexes and their counterparts are not from the same category of risk, the Capital Asset Pricing Model (CAPM) is utilized in order to estimate the risk-adjusted returns:

$$R_{i,t} = \alpha_{i,t} + \beta_{it}(R_{m,t} - R_{f,t}) \tag{21}$$

where $\alpha_{i,t}$ is an intercept or Jensen's measure of performance and β_{it} is the risk factor for index *i* at time *t* relative to the benchmark *m*. If $\alpha_{i,t}$ is positive and statistically significant, then the index *i* outperforms the market index *m*.

To test the performance of the Treynor & Mazuy model (market timing ability) and the capital asset pricing models, the OLS and Generalized Method of Moments (GMM) were adopted for both ethical and matched conventional indexes. The GMM estimator uses internal instruments; specifically, instruments that are based on lagged values of the explanatory variables that may present problems of endogeneity. To be exact, all the endogenous right-hand-side variables in the model lagged from *t-1* to *t-2* are used. To check the validity of the model specification when using GMM, the Hansen statistic of over-identifying restrictions to test for any absence of correlation between the instruments and the error term is adopted.[5]

3.4 Data and Empirical Results

1. Data

The data adopted in this study includes monthly prices of Dow Jones market indexes over the period January 1999 to July 2013. Seven regional and Five sector grouping indexes as seen in Table 3 were adopted to investigate the difference between the performance of faith-based ethical (Islamic) indexes, and conventional indexes. The data were obtained from and provided by various sources. For the portfolio indexes, the Islamic and conventional indexes were obtained from the Dow Jones market index family of DataStream. [6] The list of Seven regions indexes are Global, Asia Pacific, USA, UK, European, Developed, and Emerging markets indexes. The five sector groupings are Oil and Gas, Technology, Health-care, Consumer Goods, and Consumer Services.

Table 3 about here

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[5]For more details on the generalized method of moment, see Campbell et al. (1997), Cochrane (2001) and Guermat et al. (2004).

[6]Dow Jones Islamic indexes is a representative of Islamic investment market, it includes the stocks from 34 countries and covers 10 economic sectors, 18 market sectors, 51 industry groups and 89 subgroups, and the company whose activities are *Shariah* compliant.

To construct the market risk factor, the monthly data of *MSCI AC* World index was obtained and used as an appropriate proxy for the market index. Following Elfakhani and Hassan (2005), three months Treasury bill returns were used as a proxy for the risk free rate of return. Following Bauer et al. (2005) a world version for each of the three factors (SMB, HML, and MOM) of Carhart (1997) was constructed using all stocks of the Worldscope/Datastream universe. [7] The momentum factor was computed by taking the monthly difference of the top 30% and bottom 30% 12-month-value-weighted returns. For the Habit Formation model, consumption expenditure (C_t), is the total personal consumption expenditure reported by the Office of National Statistics in each regional area. For consumption variables associated with each individual Islamic index, a percentage of the Muslim population from the whole populations of each individual country was used to calculate the percentage of each Muslim's consumptions.

2 Descriptive Analysis

The analysis begins with the descriptive analysis. Table 4 presents the risk-return characteristics and summary statistics (mean, standard deviation, minimum, median, maximum, Kurtosis and Skewness) pertaining to Islamic indexes and their mainstream conventional counterparts. Table 4 panels *A* and *B* show that the Islamic market indexes display higher mean returns than the conventional market indexes but that they are also slightly more volatile. Most of the returns are non-normal, with evidence of negative excess skewness. This shows that the mean return of the Dow Jones Islamic indexes ranges from 0.15% to 0.35% where the *DJIAP* presents the lowest mean return and *DJIC* is the one with the maximum mean return performance. The returns of Islamic Indexes is highly volatile for *DJIC* and *DJIT* with standard deviations of 3.83% and 3.78% respectively, while the least volatile indexes are *DJIHC* and *DJICG*, with standard deviations of 1.71% and 1.77% respectively. The skewness demonstrates that most indexes are negatively skewed, indicating a distance value far from the normal one.

Table 4 about here

For the conventional indexes, the mean return ranges between 0.01% (*DJAP*) and 0.33% (*DJC*). The standard deviation, which is the measure of spread of log returns illustrates that the *DJT* and *DJEM* have the highest deviation with 3.72% and 3.55% respectively, while *DJHC* and *DJCG* have the lowest deviation with 1.69% and 1.73% respectively. Similarly, the skewness which measures the asymmetry of the probability distributions shows that all indexes are negatively skewed, indicating the higher probability of decrease in returns. These statistics suggest that on average the ethical funds (0.21%) out-perform their conventional peers (0.16%) and relevant indexes. Also, Islamic indexes are on average more risky (SD=2.61%) than conventional indexes (SD=2.47%).

3 Financial Performance Measures

In order to improve analysis, this study applied different performance measures and shows the main results for all samples of Dow Jones indexes under consideration in Table 5. While panel *A* presents results associates with performance measures *SR*, *TR*, *MM* and *eSDAR* of each region, panel *B* reports the results of the same performance measures, but for sector grouping.

Table 5 about here

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[7] Not directly available for the world market

Starting first with the Sharpe (1966) ratio *SR*, Table 5 shows that Sharpe Ratios are considerably negative and the average result is -1.21% when compared with non-Islamic indexes that are -1.30%. *DJIHC* (-1.75%) and *DJICG* (-1.71%) are the lowest Sharpe ratios, while *DJIC* (-0.75%) and *DJIT* (-0.79%) show the highest ratios indicating best performance among Islamic Index series. Overall, and in agreement with Girard and Hassan (2008), the Sharpe ratio indicates that faith-based ethical (Islamic) indexes slightly outperform their conventional peers.

The same pattern of results emerges with other ratios included in Table 5. The comparison of average Treynor Ratio shows that Dow Jones Islamic indexes out-perform their non-Islamic counterparts by -0.071% and -0.074% respectively. The *MM* ratio, on average, shows that Islamic indexes outperformed -12.78% their non-Islamic counterparts -14.40%, which is consistent with previous studies on *SR*. For *eSDAR*, the findings confirm the results associated with the Sharpe and *MM* Ratios, where IDJIs (Dow Jones Islamic indexes) outperform (-0.027%) their non-Islamic peers (-0.03%). These findings are in line with those of Statman (2000). The results show that in most cases the Islamic indexes seem to exhibit higher risk-adjusted performance than their conventional counterpart, irrespective of the alternative measures. This finding confirms those of Ashraf and Mohammad (2014) and Jawadiet al.(2014). Notably, the performance measures associated with sector groupings have a similar pattern of results, but with a clear indication that Islamic indexes and markets are sector oriented.

Next, the performance of Dow Jones indexes using Jensen's α as identified in equation 6. Table 6 shows that despite the results of non-Islamic indexes being only insignificantly different from the Islamic peers, it is worth noting the following few differences: (i)$\bar{R}^2$ shows that non faith-based ethical indexes have on average higher $\bar{R}^2$ than faith-based ethical indexes due to the greater diversification opportunities of non-Islamic indexes, (ii) Jensen's α associated with faith-based ethical indexes show better results over their non-ethical counterparts, which are in line with the Girard and Hassan (2008). For the systematic risk β, the Islamic indexes exhibit average systematic risks of 0.53%, indicating a lower level of risk associated with Islamic indexes compared to their counterparts. This is justified, as Islamic investors focus on stocks that are complaint with *Shariah* law (growth stocks rather than dividend income).

Overall, two conclusions can be drawn. First, there is no clear significant difference in performance between faith-based ethical and conventional indexes. Second, ethical indexes are less market sensitive than conventional indexes. Overall, the previous analysis does not provide any clear conclusions regarding financial performance for conventional and Islamic indexes, which may be due to the appropriateness of standard performance, notably when working with Islamic investments.

Table 6 about here

In terms of the timing ability (Treynor and Mazuy, 1966) of Dow Jones indexes, Table 7 shows that Islamic indexes outperform conventional indexes(*alpha*= 0.0009, 5% significance level). For the *TM* model, α is positive and different from the findings reported in Table 6. For β, the findings show that Islamic indexes have a negative relationship with the market index, which is in contrast to the conventional indexes performance with the CAPM model. For example β for Islamic indexes it is -0.0310, implying a negative relationship with the market portfolios. For the *TM* model, γ (the timing ability of indexes) indicates a negative relationship with the market portfolios (-0.9912) and is statistically significant at the 5% level of significance. While the positive and significant γ implies the ability of indexes to predict the performance when the market is up, the negative γ indicates that the timing ability alters the performance in a different way. For the $\bar{R}^2$, it is about 98.4 % for the Islamic index, which is slightly higher

than the conventional peers (98.3 %). The higher values of $\bar{R}^2$ reflect the strong explanatory power of the *TM* model compared to the CAPM model. Overall, the findings of *TM* model imply that the stocks in Dow Jones indexes are unable to time the market, as those types of stocks provide a negative market timing ability for both Dow Jones Islamic and their peers. The same pattern of results applies to the conventional peers and sector groupings.

Table 7 about here

In an attempt to ascertain the adequacy of the single-factor asset pricing model to explain investment performance, the performance of Islamic and conventional Dow Jones indexes was tested using Carhart (1997) model and the Habit Formation model of Campbell and Cochrane (2000). While Table 8 summarizes the estimates of the multi-factor model of Carhart (1997), Table 9 presents the GMM estimates of the habit formation model. In general, these findings suggest that (i) the predictability power associated with the multi-factor models ($\bar{R}^2$) is higher than those associated with the single-factor model. This confirms this paper's expectation that multi-factor models are superior in explaining investment returns; (ii) ethical investments/indexes are less exposed to the market portfolio than their conventional peers; (iii) for ethical indexes, the world, EU, ASP, DEV and emerging markets are heavily exposed to small caps while US and UK indexes are relatively more invested in large caps. Similarly, Technology and Consumption Service sector ethical indexes are heavily exposed to small caps, while Oil and Gas, Health care and Consumption Goods investments are comparatively more invested in large caps. Interestingly, and in line with Guerard (1997), the negative relationship with the *HML* factor indicates that Islamic indexes are more growth-oriented, while non-ethical indexes, which have a positive relationship with the *HML* factor are more value-oriented; (iv) the inclusion of market risk, size, book-to-market and momentum (Carhart factors) has no clear impact on the difference in performance between faith-based ethical and conventional indexes. Overall, the previous analysis does not provide clear conclusions regarding financial performance for either conventional or Islamic indexes.

Table 8 about here

For the habit formation model, Table 9 presents the GMM estimates for the Fourteen Islamic and conventional Dow Jones indexes, (World, EU, ASP, DEV, EMRG, US, UK) and Ten sector groupings (OG, TEC, TEL, CG, CS) using stock returns and consumption for each index. The findings show that the model is not rejected on the basis of Hansen's test of over-identifying restrictions and can be (γ) estimated to be both of theoretically plausible value and also significant. These results are broadly comparable to the findings of Hyde and Sherif (2005) who found supportive evidence for the Habit Formation specifications with U.K. stock returns. For the performance of Islamic and conventional indexes, the study detailed in this current paper also found that in most cases the Islamic indexes either outperformed the non-Islamic indexes or that there is only an insignificant difference in performance between both indexes.

Table 9 about here

In order to improve our analysis and as a robustness test, this study went further by testing the same previous investment performance measures, but did so during the financial crises. Table 10 presents a comparison between the performance of Islamic Dow Jones indexes and conventional peers during the financial crisis period, June 2008 to July 2013, using the same set of performance measures as before (*SR*, *TR*, *MM* and *eSDAR*). It is clear from Table 10 that the performance of the non-Islamic *DJ* (*SR*=-15.79%, *TR*=-1.18%, MM= -30.00%, eSDAR=-0.18%) are inferior to Islamic peers (*SR*=-0.16.79%, *TR*=-1.27%, *MM*=-44.25%, *eSDAR*=-0.22%). Comparing these results with those associated with the entire period, it is possible conclude that both investments (Islamic and conventional) have on average performed better during the crisis period, but faith-based ethical investments performed comparatively well in the crisis period.

Table 10 about here

With regard to Jensen's α, Table 11 presents the results associated with equation 6 but this time during the financial crises period. It is clear from the table that the performance of the faith-based ethical (Islamic) *DJ* indexes also outperformed the conventional indexes during the financial crisis period, which is in line with previous studies that made similar comparison between Islamic and conventional peers (Hamilton et al., 1993; Luther and Matatko, 1994; Diltz , 1995; Mallin et al., 1995; Sauer, 1997; Girard and Hassan, 2008; Goldreyer et al., 1999; Statman, 2000; Durand et al., 2013a; Becchettia et al., 2015).

Table 11 about here

In terms of the investigation of the faith-based ethical DJ indexes using *TM* model during the crisis period. Table 12 shows a similar pattern to the previous results: faith-based ethical indexes slightly outperformed conventional indexes during the financial crisis period. On average there were performances of α= 0.26%, β=5.23%, γ=-74.05%, $\bar{R}^2 = 97.65\%$ for conventional investments, while the faith-based ethical indexes on average showed performance of α=0.36%, β=7.47%, γ=-71.35%, $\bar{R}^2 = 97.82\%$. For sector groupings, the performance is dominated by Technology and consumption services sector groupings, as they still performed well in comparison to the rest of the sector groupings. This again implies that the faith-based ethical indexes are sector oriented.

With regard to investigating whether faith-based ethical investments have superior performance over their unscreened benchmarks, and whether sector-specific investment performance differs from the economy level using the multi-factor tests during the finical crises, the same pattern of results emerges. Again, *SMB* (small minus big) is the difference between returns on a small capitalisation portfolio and a large-capitalisation portfolio; HML (high minus low) is the difference between returns on a portfolio with a high book-to-market ratio and a portfolio with a low book-to-market ratio. *MoM* is the average return on the past winner stocks minus the average return on the past loser stocks. The findings show some improvements in $\bar{R}^2$ for both the four-factor model (0.80) and the single-factor CAPM model, which is (0.50) respectively when using conventional indexes. For the Islamic indexes, the same pattern holds, as the adjusted $\bar{R}^2$ stands at 0.78, and 0.57 for the 4-factor and the CAPM models respectively. In general, this implies that the four-factor model (Carhart, 1997) is more effective in explaining index performance, suggesting strong time-variation in betas.[8]

[8]Results not reported. All results available from the authors on request.

Table 12 about here

Overall, the above results show cautious support for the null hypothesis H_0 of this study: that, there is no clear evidence that ethically screened investments underperform conventional investments. Whilst the financial performance of faith-based ethical (Islamic) and conventional investments is relatively close in the first sample (pre-crisis), faith-based ethical (Islamic) indexes appear to outperform their peers during the financial crisis. However, the results are strongly dependent on the performance measure and the period and region under consideration.

4 Conclusion

Using seven Dow Jones faith-based ethical (Islamic) indexes to their seven conventional counterparts, a range of investment performance measures and most recent asset pricing models, this paper aimed to provide new evidence regarding whether faith-based ethical investments have superior performance over their unscreened benchmarks, and whether sector-specific investment performance differs from the aggregate market level. This study covers the period 1999-2013, which made it possible to capture the impact of the recent global financial crisis on the performance of investments.

From the analysis of this paper, a number of interesting results can be drawn. Firstly, there is no convincing evidence supporting the performance differences between faith-based ethical (Islamic) and conventional indexes, in particular after the inclusion of the common factors such as size, book-to-market, momentum, and the habit formation specifications of Muslim and non Muslim investors. Secondly, ethical investments have distinct investment styles compared to conventional investments. For example, ethical investments are typically less exposed to market return variability compared to conventional investments. In addition, the world, EU, ASP, DEV and emerging markets ethical indexes are heavily exposed to small caps while the US and UK indexes, on the other hand, are comparatively more invested in large caps. Similarly, Technology and Consumption Service sector groupings for the ethical indexes are heavily exposed to small caps, whereas Oil and Gas, Health Care and Consumption Goods indexes are relatively more invested in large caps. Thirdly, overall, similar rewards for risk and diversification benefits exist for both indexes. When controlling performance for style and time variability, the findings notably show that Islamic indexes are growth-based, whereas conventional indexes are value-based. Finally, when investigating the performance of ethical indexes relative to conventional indexes overtime time, in particular during the recent financial crisis, the Islamic indexes outperform the conventional ones. Interestingly, the findings shown here indicate that ethical indexes perform better than standard conventional indexes and this explains ethical investments returns. The conclusions with respect to indexes performance when using sectorial indexes were, however, unaffected. This clearly indicates that Islamic and markets are sector oriented. For the performance of habit formation model with faith-based ethical Islamic and conventional indexes, this study found that the 'Habit Formation' specification of Campbell and Cochrane (2000) appears to offer a more accurate and feasible explanation and works well as a measure of investment performance for both ethical and conventional indexes.

The findings of this study offer insights for international investors, institutions and policy makers interested in the performance of faith-based ethical Islamic investments in both the emerging and developed market setting. While investors can reconcile faith with finance, the financial market authorities could revise their regulations and legislation to enable banks and markets to include these types of products, and to propose new products with similar characteristics. Policy makers may consider the feasibility of establishing an integrated Islamic financial market by forming an economic union among Muslim

countries with similar economic characteristics. While this study helps rectify some of the gaps in the existing literature into faith-based ethical investments in general, and in emerging markets in particular, it highlights a number of others for further research. The most possible immediate expansion would be to include certain ethical indexes (Christian and Jewish) omitted in this study due to the unavailability of the data. Such indexes may also be influential in explaining the performance of faith-based ethical investments. In addition, future research should also look into Islamic sub-indexes and include other institutions that are Islamic subsidiaries of conventional banks. Finally, to more effectively explain the reason why Islamic indexes and markets are sector oriented will be a key subject for future research.

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Table 1: Stages of Evolution of the Islamic Financial Services

1970	*1980*	*1990*	*2000*
Area			
Gulf and Middle East	Gulf and Middle East Asia Pacific	Gulf and Middle East Asia Pacific	Gulf and Middle East Asia Pacific Europe / Americas Global Offshore Market
Institutions			
Commercial Islamic banks	Commercial Islamic banks Takaful Islamic investment com.	Commercial Islamic banks Takaful Islamic investment com. Asset management companies Brokers/Dealers	Commercial Islamic banks Takaful Islamic investment com. Asset management companies Brokers/Dealers E-commerce
Products			
Commercial Islamic banks Products	Commercial Islamic Commercial Islamic Takaful	Commercial Islamic banks Products Takaful Mutual Funds/Unit trust Islamic bonds Shariah-compliant stocks Islamic stock broking	Commercial Islamic banks Products Takaful Mutual Funds/Unit trust Islamic bonds Shariah-compliant stocks Islamic stock broking

Table 2: Summary of Selected Literature Review

Study	Sample	Methodology	Important findings
Hamilton et al.(1993)	32 American SRI funds and 170 conventional funds(1981-1990)	Jensen's Alpha	No significantly different performance.
Annuar et al.(1997)	31 Malays investment funds predominantly Islamic(1995-2004)	Treynor and Mazuy model	Islamic funds outperform.
Statman (2000)	DSI index and the S&P 500. SRI and Conventional funds(1990-1998)	Std dev, Mean-return, Jensen's Alpha	Insignificantly different performance.
Hassan(2002)	Dow Jones Islamic index (DJIMI)(1996-2000)	Common statistical tests	Insignificantly different performance.
Ahmed and Ibrahim, 2003	Kuala Lumpur Syariah and composite indexes (1999-2002)	Sharpe ratio, Treynor ratio, AJAI	Equal performance
Hakim and Rashidian (2004)	DowJones Islamic index, ethical Green index(2000-2004)	CAPM	FTSE Shariah index bears higher systematic risk compared to the Green Index
Hussein and Omran(2005)	DJ Islamic index and DJ conventional index(1995-2003)	Sharpe ratio, Jensen's Alpha, Treynor ratio Cumulative abnormal return, buy-and-hold abnormal return	Islamic index outperform conventional index both in the entire and in bullish periods.
Hussein (2005)	FTSE Global Islamic and the Dow Jones Islamic index(1993-2004)	Jensen's Alpha	FTSE Global Islamic index Underperforms their counterparts.
Elfakhani et al.(2005)	46 global Islamic mutual funds classified into eight sector-based categories(1997-2002)	ANOVA tests, Sharpe ratio	Equal performance.
Abdullah et al.(2007)	65 Malaysians including 14 Islamic funds(1992-2001)	Sharpe ratio, ASI, Treynor ratio, MM, Information Ratio	Islamic funds outperform during bearish periods.
Abderrezak (2008)	46 international Shariah compliant Equity funds(1997-2002)	Sharpe, Jensen and the Fama and French Three Factor Model	Equal performance periods.
Albaity and Ahmad(2008)	Kuala Lumpur Syariah and composite indexes - bull and bear periods(1999-2005)	Sharpe ratio, Treynor ratio, AJAI, eSDAR, Causality and Johanson co-integration tests	Equal performance.
Fernandez and Matallin(2008)	13 Spanish ethical mutual funds and a total of 2064 mutual funds(1998-2001)	Multifactor regression model, bootstrap method	Spanish ethical funds outperform.
Hashim (2008)	FTSE Global Islamic index(1999-2003)	Jensen's Alpha	Islamic Equity index outperform conventional index.
Hoepner et al.(2010)	265 investment funds in shares of twenty Islamic countries(1990-2009)	CAPM, Conditional three level Carhart model	Heterogeneity in Islamic funds' performance due to national characteristics.
Hayat and Kraeussl(2011)	145 Islamic equity funds(2000-2009)	CAPM	Islamic Equity funds underperform.
Jouber-Snoussi et al. (2012)	Dow Jones Islamic indexes (1996-2009)	Different measurement techniques	Insignificantly different performance
Mansor and Bhatti (2011)	128 Islamic mutual funds in Malaysia(IMFs)(1990-2009)	CAPM model	Malaysian Islamic Mutual Funds outperform.
Rayat (2006)	59 Malaysian Islamic Equity funds (2001-2006)	Common statistical tests	Islamic Equity funds under-perform.
Abbes (2012)	35 international indexes including developed, emerging and GCC markets(2002-2012)	Sharpe ratio	Equal performance
Ho et al. (2014)	12 Islamic indices 2000-2011	Sharpe ratio, Jensen's alpha,their conventional indices Treynor ratio	Mixed results.
Jawadi et al. (2014)	3 DJ Islamic indexes vs their conventional indices 2000-2011	Sharpe ratio, Jensen's alpha, Treynor ratio, Omega ratio, Roy ratio & Black-Treynor ratio	Mixed results
Ashraf and Mohammad (2014)	12 global and regional Islamic indices vs their conventional indices(MSCI, DJ and S&P)2002-2012	LSTAR model	Mixed results.
Al-Khazali et al. (2014)	9 DJ Islamic indexes vs their conventional indices 1996-2012	stochastic dominance analysis	Mixed results.
Charles et al.(2015)	6 Dow Jones Islamic indexes relative to their conventional counterparts (1996-2013)	Risk and performance measures	Mixed results.

Table 3: List of Dow Jones Islamic and Conventional indexes

ISLAMIC	*CONVENTIONAL*
REGION/COUNRTY	***REGION/COUNRTY***
DJ Islamic World	DJTM World
DJ Islamic Asia Pacific	DJTM Asia/Pacific
DJ Islamic Euro	DJTM Euro
DJ Islamic UK	FTSE UK
DJ Islamic US	DJ US Total Stock Market
DJ Islamic World Emerging Markets	DJTM World Emerging Markets
DJ Islamic World Developed	DJTM World Developed
SECTOR	***SECTOR***
DJ Islamic Oil & Gas	DJTM World Oil & Gas
DJ Islamic Technology	DJTM World Technology
DJ Islamic Healthcare	DJTM World Healthcare
DJ Islamic Consumer Goods	DJTM World Consumer Goods
DJ Islamic Consumer Services	DJTM World Consumer Services

Table 4: Descriptive Statistics of Ethical& Conventional DJ Indexes

	Mean	*Std.Dev.*	*Kurtosis*	*Skewness*	*Minimum*	*Maximum*
Panel A: Dow Jones, Faith-based ethical Islamic Indexes						
DJIW	0.0020	0.0221	2.251	-1.104	-0.0984	0.0413
DJIE	0.0019	0.0267	2.756	-1.057	-0.1249	0.0541
DJIAP	0.0015	0.0282	3.5609	-0.7364	-0.1462	0.0726
DJID	0.0019	0.0218	1.9630	-1.081	-0.0929	0.0401
DJIEM	0.0016	0.0366	4.165	-1.115	-0.1833	0.0864
DJIUS	0.0020	0.0224	0.7268	-0.8160	-0.0741	0.0448
FTSIUK	0.0016	0.0212	2.468	-0.8365	-0.0881	0.0582
DJIOG	0.0028	0.0266	1.565	-0.5844	-0.0994	0.0765
DJIT	0.0020	0.0378	1.497	-0.6456	-0.1519	0.0836
DJIHC	0.0020	0.0171	1.122	-0.7104	-0.0592	0.0410
DJICG	0.0017	0.0177	4.391	-1.407	-0.0902	0.0419
DJICS	0.0026	0.0223	1.382	-0.5936	-0.0849	0.0590
Panel B: Dow Jones Non faith-based ethical Indexes						
DJW	0.0013	0.0214	3.909	-1.333	-0.1092	0.0435
DJE	0.0015	0.0269	4.096	-1.234	-0.1387	0.0604
DJAP	0.0001	0.0262	3.288	-0.8223	-0.1363	0.0621
DJD	0.0012	0.0210	3.471	-1.281	-0.1040	0.0410
DJEM	0.0014	0.0355	5.238	-1.445	-0.1841	0.0750
DJUS	0.0016	0.0210	1.497	-0.9648	-0.0848	0.0448
FTSUK	0.0010	0.0210	3.442	-0.9596	-0.1013	0.0607
DJOG	0.0028	0.0268	1.731	-0.6379	-0.1032	0.0732
DJT	0.0018	0.0372	1.326	-0.6618	-0.1459	0.0802
DJHC	0.0020	0.0169	1.514	-0.8318	-0.0601	0.0393
DJCG	0.0016	0.0173	4.122	-1.419	-0.0862	0.0368
DJCS	0.0014	0.0209	2.257	-1.031	-0.0944	0.0410

Islamic World (IW); Islamic Euro(IE); Islamic Asia Pacific(IAP); Islamic Developed countries(ID); Islamic Emerging markets(IEM); Islamic United States(IUS); Islamic United Kingdom (IUK-); Islamic Oil and Gas(IOG); Islamic Technology (IT); Islamic Healthcare (IHC); Islamic Consumer Goods(ICG); Islamic Consumer Services(ICS).

Table 5: Financial Performance Evaluation from Standard Ratios

Panel A: Country/region					
		SR	**TR**	**MM**	**eSDAR**
World	ISM	-1.354	-0.0650	-15.57	-0.0330
	$CONV$	-1.435	-0.0700	-17.34	-0.0360
EU	ISM	-1.126	-0.0640	-10.58	-0.0220
	CON	-1.130	-0.0630	-10.67	-0.0220
AP	ISM	-1.079	-0.0650	-9.558	-0.0200
	CON	-1.217	-0.0740	-12.56	-0.0260
DEV	ISM	-1.378	-0.0710	-16.09	-0.0340
	CON	-1.465	-0.0720	-17.98	-0.0380
EMERG	ISM	-0.8270	-0.0500	-4.055	-0.0090
	CON	-0.8610	-0.0520	-4.797	-0.0100
US	ISM	-1.335	-0.0710	-15.14	-0.0320
	CON	-1.447	-0.0720	-17.58	-0.0370
UK	ISM	-1.433	-0.0860	-17.28	-0.0360
	CON	-1.473	-0.0820	-18.17	-0.0380
Panel B: Sector level					
OG	ISM	-1.095	-0.0810	-9.908	-0.0210
	CON	-1.088	-0.0800	-9.758	-0.0200
Tec	ISM	-0.7920	-0.0480	-3.292	-0.0070
	CON	-0.8100	-0.0480	-3.687	-0.0080
Hel	ISM	-1.752	-0.1330	-24.25	-0.0510
	CON	-1.775	-0.1280	-24.75	-0.0520
CG	ISM	-1.706	-0.1010	-23.24	-0.0490
	CON	-1.754	-0.0990	-24.31	-0.0510
CS	ISM	-1.313	-0.0800	-14.67	-0.0310
	CON	-1.461	-0.0760	-17.89	-0.0380

Table 6: Estimations CAPM Model

	Panel A: Country/Region							
	ISLM				CONV			
	$Jensen's\ \alpha$		β	R^2	$Jensen's\ \alpha$		β	R^2
$World$	-0.0144		0.5291	0.8097	-0.0151		0.5294	0.8201
	(-13.18)		(27.15)		(-14.27)		(28.10)	
EU	-0.0136		0.5597	0.7374	-0.0137		0.5688	0.7454
	(-9.5563)		(22.06)		(-9.665)		(22.52)	
ASP	-0.0137		0.5705	0.6394	-0.0161		0.5341	0.5868
	(-7.481)		(17.54)		(-8.445)		(15.71)	
DEV	-0.0147		0.5209	0.8044	-0.0154		0.5208	0.8172
	(-13.44)		(26.69)		(-14.68)		(27.83)	
$EMRG$	-0.0095		0.7091	0.6673	-0.0099		0.7039	0.6582
	(-4.434)		(18.65)		(-4.583)		(18.27)	
US	-0.0147		0.5195	0.7807	-0.0152		0.5149	0.8108
	(-12.47)		(24.83)		(-14.34)		(27.24)	
UK	-0.0172		0.4496	0.6141	-0.0172		0.4665	0.6726
	(-11.30)		(16.62)		(-12.40)		(18.87)	
	Panel B: Sectors							
	ISLM				CONV			
	$Jensen's\ \alpha$		β	R^2	$Jensen's\ \alpha$		β	R^2
OG	-0.0154		0.4666	0.4991	-0.0152		0.4755	0.5089
	(-7.742)		(13.16)		(-7.625)		(13.42)	
TEC	-0.0089		0.7136	0.6828	-0.0088		0.7243	0.7086
	(-4.311)		(19.32)		(-4.455)		(20.53)	
HEL	-0.0205		0.3220	0.4256	-0.0202		0.3328	0.4504
	(-12.85)		(11.36)		(-12.91)		(11.94)	
CG	-0.0183		0.4083	0.5827	-0.0181		0.4184	0.6080
	(-12.41)		(15.57)		(-12.60)		(16.41)	
CS	-0.0152		0.4822	0.6388	-0.0158		0.5028	0.7400
	(-9.795)		(17.52)		(-12.38)		(22.21)	
$t.statistics$	-9.432		19.0		-10.39		20.26	

Table 7: Treynor and Mazuy Model

	ISLM				***CONV***			
	α	β	γ	$\bar{R}^2$	α	β	γ	$\bar{R}^2$
Panel A: Country/region								
$World$	0.0008	-0.0291	-0.9874	0.9815	0.0006	-0.0200	-0.9713	0.9814
	(1.626)	(-1.912)	(-40.01)		(1.066)	(-1.294)	(-38.67)	
EU	0.0004	-0.0122	-0.9597	0.9854	0.0003	-0.0060	-0.9501	0.9859
	(1.0300)	(-1.0067)	(-54.02)		(0.6915)	(-0.4956)	(-54.23)	
ASP	0.0009	-0.0297	-0.9892	0.9875	0.0009	-0.0312	-0.9911	0.9868
	(2.169)	(-2.801)	(-69.10)		(2.113)	(-3.150)	(-72.32)	
DEV	0.0009	-0.0314	-0.9913	0.9811	0.0006	-0.0234	-0.9770	0.9808
	(1.717)	(-2.083)	(-40.06)		(1.199)	(-1.515)	(-38.33)	
$EMRG$	0.0008	-0.0194	-0.9774	0.9917	0.0007	-0.0167	-0.9736	0.9917
	(2.195)	(-1.808)	(-81.88)		(2.052)	(-1.585)	(-83.35)	
US	0.0013	-0.0463	-1.018	0.9816	0.0012	-0.0419	-1.010	0.9805
	(2.614)	(-3.217)	(-43.30)		(2.194)	(-2.683)	(-38.67)	
UK	0.0009	-0.0325	-0.9924	0.9806	0.0006	-0.0242	-0.9760	0.9804
	(1.907)	(-3.122)	(-56.95)		(1.222)	(-2.155)	(-51.98)	
Panel B: Sector level								
OG	0.0007	-0.0270	-0.9816	0.9854	0.0007	-0.0260	-0.9800	0.9858
	(1.809)	(-3.122)	(-75.82)		(1.766)	(-2.905)	(-75.87)	
TEC	0.0012	-0.0485	-1.016	0.9915	0.0012	-0.0497	-1.017	0.9914
	(3.280)	(-4.262)	(-79.02)		(3.295)	(-4.170)	(-75.40)	
HEL	0.0010	-0.0358	-0.9988	0.9736	0.0009	-0.0346	-0.9956	0.9739
	(2.022)	(-4.197)	(-59.75)		(1.884)	(-3.96)	(-58.69)	
CG	0.0007	-0.0279	-0.9813	0.9777	0.0007	-0.0295	-0.9852	0.9778
	(1.381)	(-2.808)	(-55.25)		(1.525)	(-2.859)	(-53.57)	
CS	0.0012	-0.0427	-1.0124	0.9825	0.0010	-0.0355	-0.9985	0.9813
	(2.77)	(-3.920)	(-58.055)		(2.034)	(-2.738)	(-47.08)	
$t.statistics$	2.067	-2.791	-61.79		1.741	-2.368	-57.81	

Table 8: Four-Factor Carhart Model

	ISLM						***CONV***					
	α	β_m	β_{smb}	β_{hml}	β_{mom}	R^2	α	β	β_{smb}	β_{hml}	β_{mom}	R^2
Panel A: Country/region												
$World$	0.0014	0.4491	0.0352	-0.1021	-0.0277	0.94	-0.0001	0.4485	0.0413	0.0064	0.0054	0.95
	(0.0004)	(0.0103)	(0.0131)	(0.0145)	(0.0111)		(0.0004)	(0.0089)	(0.0114)	(0.0255)	(0.0097)	
EU	0.0000	0.5024	0.0988	0.0100	0.0427	0.76	-0.0006	0.5158	-0.0942	0.0976	0.0566	0.77
	(0.0010)	(0.0238)	(0.0304)	(0.0336)	(0.0259)		(0.0010)	(0.0236)	(0.0302)	(0.0332)	(0.0256)	
ASP	0.0002	0.4744	0.0727	-0.0935	-0.0048	0.65	-0.0012	0.4276	0.0606	-0.0210	0.0089	0.58
	(0.0013)	(0.0302)	(0.0385)	(0.0425)	(0.0327)		(0.0013)	(0.0309)	(0.0394)	(0.0435)	(0.0335)	
DEV	0.0011	0.4358	0.0333	-0.1038	-0.0264	0.93	-0.0001	0.4411	-0.0390	0.0060	0.0055	0.95
	(0.0004)	(0.0102)	(0.0131)	(0.0144)	(0.0111)		(0.0004)	(0.0087)	(0.0111)	(0.0122)	(0.0094)	
$EMRG$	-0.0001	0.6015	0.1376	-0.0788	-0.0341	0.65	-0.0005	0.5870	0.1304	0.0039	-0.0103	0.63
	(0.0017)	(0.0393)	(0.0502)	(0.0554)	(0.0427)		(0.0017)	(0.0393)	(0.0502)	(0.0553)	(0.0017)	
US	0.0014	0.4244	-0.0223	-0.1587	-0.0629	0.91	0.0004	0.4291	-0.0407	-0.0281	-0.0158	0.93
	(0.0005)	(0.0124)	(0.0158)	(0.0174)	(0.0134)		(0.0004)	(0.0097)	(0.0124)	(0.0136)	(0.0105)	
UK	0.0004	0.3889	-0.0283	0.0367	0.0358	0.64	-0.0004	0.4071	-0.01320	0.1072	0.0399	0.75
	(0.0009)	(0.0230)	(0.0294)	(0.0324)	(0.0250)		(0.0008)	(0.0191)	(0.0242)	(0.0268)	(0.0206)	
Panel B: Sector level												
OG	0.0009	-0.4325	-0.0029	0.1354	0.1052	0.48	0.0008	0.4412	-0.0060	0.1444	0.1117	0.49
	(0.0015)	(0.0350)	(0.0447)	(0.0492)	(0.0380)		(0.0015)	(0.0348)	(0.0444)	(0.0489)	(0.0378)	
TEC	0.0021	0.5527	0.1392	-0.4267	-0.2448	0.81	0.0017	0.5586	0.1588	-0.4049	-0.2310	0.84
	(0.0017)	(0.0294)	(0.0376)	(0.0415)	(0.0320)		(0.0011)	(0.0265)	(0.0339)	(0.0374)	(0.0011)	
HEL	0.0016	0.2651	-0.1066	0.0141	0.0210	0.45	0.0014	0.2720	-0.0884	0.0244	0.0230	0.48
	(0.0009)	(0.0229)	(0.0293)	(0.0322)	(0.0248)		(0.0008)	(0.0220)	(0.0281)	(0.0310)	(0.0239)	
CG	0.0004	0.3419	-0.0192	0.0832	0.0586	0.69	0.0001	0.3406	0.0229	0.1096	0.0567	0.76
	(0.0008)	(0.0179)	(0.0229)	(0.0253)	(0.0195)		(0.0006)	(0.0153)	(0.0951)	(0.0215)	(0.0166)	
CS	0.0011	0.3846	0.1295	-0.0397	0.0161	0.72	0.0001	0.4027	0.0818	0.0033	-0.0091	0.86
	(0.0009)	(0.0213)	(0.0272)	(0.0299)	(0.0231)		(0.0006)	(0.0141)	(0.0181)	(0.0199)	(0.01534)	

Table 9: GMM Estimations of Habit Formation Model

	ISLM			CONV		
	β	γ	χ^2	β	γ	χ^2
	Panel A: Country/region					
$World$	1.008	0.4230	1.0831	1.010	0.4118	0.7739
	(0.0048)	(0.0344)	[0.7811]	(0.0047)	(0.0286)	[0.8557]
EU	1.011	0.6729	1.198	1.009	0.5423	1.197
	(0.0077)	(0.0099)	[0.7534]	(0.0068)	(0.0665)	[0.7537]
ASP	1.003	0.0398	2.802	1.012	0.5436	0.6424
	(0.0040)	(0.0847)	[0.4230]	(0.0070)	(0.0122)	[0.8866]
DEV	1.008	0.4259	1.115	1.005	0.3949	0.8442
	(0.0047)	(0.0271)	[0.7733]	(0.0046)	(0.0204)	[0.8388]
$EMRG$	1.0128	0.4201	1.326	1.0165	0.7529	0.3107
	(0.0079)	(0.0710)	[0.7228]	(0.0083)	(0.1295)	[0.7643]
US	1.006	0.3448	1.094	1.011	0.3367	1.356
	(0.0039)	(0.0887)	[0.7785]	(0.0041)	(0.0918)	[0.7159]
UK	1.007	0.4553	3.421	1.006	0.4173	3.539
	(0.0057)	(0.0792)	[0.3311]	(0.0053)	(0.0894)	[0.3156]
	Panel B: Groupings					
OG	1.0064	0.2828	0.6113	1.0058	0.2513	0.5649
	(0.0028)	(0.0414)	[0.8938]	(0.0027)	(0.0398)	[0.9044]
TEC	1.0032	0.5579	0.0730	1.0023	0.3287	0.1026
	(0.0042)	(0.0390)	[0.9949]	(0.0041)	(0.0407)	[0.9915]
HEL	1.002	0.1112	3.487	1.0009	0.0557	3.436
	(0.0017)	(0.0980)	[0.3223]	(0.0018)	(0.0078)	[0.3291]
CG	1.006	0.3211	0.1584	1.005	0.2836	1.587
	(0.0026)	(0.0232)	[0.9839]	(0.0024)	(0.0111)	[0.6622]
CS	1.006	0.6887	2.775	1.009	0.2542	3.343
	(0.0027	(0.0347)	[0.4276]	(0.0024)	(0.0303)	[0.3417]

Note: INST = GMM estimation performed with instrument, (1, C_t/C_{t-1}, $R_{m,t-1}$, C_{t-1}/C_{t-2}, $R_{m,t-2}$. χ^2 is Hansen's test of overidentifying restrictions. Asymptotic standard errors are in parentheses and asymptotic p-values are in brackets.

Table 10: Sharpe, Treynor, MM and eSDAR Ratios During Financial Crisis

		SR	***TR***	***MM***	***eSDAR***
Panel A: Country/region					
World	$CONV$	-0.3512	-0.0131	-0.6763	-0.0033
	ISM	-0.1729	-0.0123	-0.5128	-0.0025
EU	$CONV$	-0.2357	-0.0178	-1.409	-0.0069
	ISM	-0.2034	-0.0155	-0.9478	-0.0047
AP	$CONV$	-0.1367	-0.0082	0.4305	0.0021
	ISM	-0.1286	-0.0107	-0.0246	-0.0001
DEV	$CONV$	-0.2021	-0.0143	-0.9305	-0.0046
	ISM	-0.1856	-0.0132	-0.6939	-0.0034
EMERG	$CONV$	-0.0994	-0.0077	0.5348	0.0026
	ISM	-0.0785	-0.0060	0.4332	0.0041
US	$CONV$	-0.1921	-0.0138	-0.7873	-0.0039
	ISM	-0.1649	-0.0118	-0.3997	-0.0020
UK	$CONV$	-0.2139	-0.0165	-1.098	-0.0054
	ISM	-0.2131	-0.0162	-1.087	-0.0053
Panel B: Sectors					
OG	$CONV$	-0.2642	-0.0204	-1.816	-0.0089
	ISM	-0.2692	-0.0206	-1.887	-0.0093
Tec	$CONV$	-0.1119	-0.0082	0.3565	0.0018
	ISM	-0.0973	-0.0072	0.5653	0.0028
Hel	$CONV$	-0.1739	-0.0148	-0.5273	-0.0026
	ISM	-0.1683	-0.0140	-0.4481	-0.0022
CG	$CONV$	-0.1194	-0.0087	0.2506	0.0012
	ISM	-0.1160	-0.0085	0.2978	0.0015
CS	$CONV$	-0.1142	-0.0085	0.3239	0.0016
	ISM	-0.1002	-0.0072	0.5241	0.0026

Table 11: CAPM Jensen's α During Financial Crisis

	Panel A: Country/region					
	CONV			*ISLM*		
	$Jensen's\ \alpha$	β	R^2	$Jensen's\ \alpha$	β	R^2
$World$	-0.0015	0.4826	0.9591	-0.0013	0.5184	0.9694
	(-1.062)	(23.74)		(-0.9448)	(27.58)	
EU	-0.0046	0.5845	0.8568	-0.0036	0.6292	0.8427
	(-1.331)	(12.03)		(-0.9223)	(11.38)	
ASP	0.0009	0.5662	0.8243	-0.0004	0.5270	0.8231
	(0.2420)	(10.65)		(-0.1205)	(10.61)	
DEV	-0.0020	0.4667	0.9623	-0.0017	0.5049	0.9726
	(-1.531)	(24.75)		(-1.358)	(29.18)	
$EMRG$	0.0014	0.6739	0.8065	0.0026	0.7001	0.8460
	(0.2884)	(10.05)		(0.6106)	(11.52)	
US	-0.0016	0.4147	0.9421	-0.0009	0.4620	0.9695
	(-1.0823)	(19.78)		(-0.7522)	(27.64)	
UK	-0.0031	0.4793	0.8138	-0.0031	0.4991	0.8502
	(-0.9392)	(10.29)		(-1.024)	(11.71)	
	Panel B: Sector level					
	CONV			***ISLM***		
	$Jensen's\ \alpha$	β	R^2	$Jensen's\ \alpha$	β	R^2
OG	-0.0053	0.5236	0.8131	-0.0046	0.5339	0.8279
	(-1.4861)	(10.26)		(-1.592)	(10.79)	
TEC	0.0007	0.4921	0.9049	0.0013	0.5100	0.9073
	(0.3265)	(15.14)		(0.5637)	(15.36)	
HEL	-0.0014	0.2954	0.7047	-0.0012	0.3115	0.7340
	(-0.5074)	(7.634)		(-0.4610)	(8.199)	
CG	0.0005	0.3965	0.9292	0.0005	0.3938	0.9147
	(0.2883)	(17.77)		(0.3025)	(16.07)	
CS	0.0009	0.3778	0.9080	0.0011	0.4364	0.9505
	(0.2997)	(15.42)		(0.7776)	(21.47)	
$t.statistics$	-0.5327	14.42		-0.3936	16.56	

Table 12: Treynor and Mazuy Model during Financial Crisis

	CONV				***ISLM***			
	α	β	γ	$\bar{R}^2$	α	β	γ	$\bar{R}^2$
Panel A: Country/region								
$World$	0.0014	0.1735	-0.5390	0.9823	0.0013	0.2117	-0.5033	0.9845
	(1.290)	(3.041)	(-5.574)		(1.231)	(3.270)	(-4.842)	
EU	0.0028	-0.0033	-0.8703	0.9808	0.0033	-0.0308	-0.9165	-0.9165
	(2.005)	(-0.0650)	(-12.23)		(2.336)	(-0.5917)	(-13.57)	
ASP	0.0034	0.0159	-0.8374	0.9836	0.0031	0.0190	-0.8222	0.9817
	(2.944)	(0.3974)	(-15.001)		(2.701)	(0.4823)	(-14.14)	
DEV	0.0010	0.1854	-0.5046	0.9821	0.0009	0.2309	-0.4600	0.9838
	(0.8798)	(3.306)	(-5.158)		(0.7926)	(3.388)	(-4.102)	
$EMRG$	0.0036	0.0081	-0.8706	0.9885	0.0037	0.0309	-0.8460	0.9898
	(3.078)	(0.2104)	(-19.14)		(3.342)	(0.7675)	(-18.03	
US	0.0015	0.1308	-0.5615	0.9716	0.0012	0.2252	-0.4283	0.9782
	(1.228)	(2.225)	(-4.988)		(0.9753)	(2.973)	(-3.182)	
UK	0.0031	-0.0277	-0.8891	0.9713	0.0029	-0.0048	-0.8540	0.9738
	(2.221)	(-0.5707)	(-11.28)		(2.078)	(-0.0929)	(-10.45)	
Panel B: Sector level								
OG	0.0031	-0.0417	-0.9199	0.9751	0.0030	-0.0289	-0.9008	0.9763
	(2.121)	(-0.8393)	(-12.27)		(1.999)	(-0.5761)	(-12.03)	
TEC	1.0032	0.0296	-0.3934	0.9721	0.0034	0.0326	-0.7945	0.9741
	(2.262)	(0.4612)	(-7.503)		(2.655)	(0.5105)	(-7.771)	
HEL	0.0027	-0.0067	-0.7819	0.9482	0.0027	0.0027	-0.7674	0.9542
	(2.262)	(-0.2007)	(-10.44)		(2.299)	(0.0817)	(-10.56)	
CG	0.0024	0.1193	-0.5688	0.9782	0.0026	0.0927	-0.6212	0.9704
	(2.636)	(2.975)	(-7.273)		(2.450)	(1.949)	(-6.648)	
CS	1.0026	0.0916	-0.4107	0.9718	0.0026	0.1550	-0.533	0.9824
	(2.581)	(2.202)	(-7.281)		(2.933)	(3.461)	(-6.529)	
$t.statistics$	2.186	1.02	-10.62		2.181	1.254	-9.562	